Selway River

General Information

The study reach is about a 2,340 ft length of river at the USGS gage 13336500 (Selway River near Lowell, ID) in the Nez Perce National Forest. The stream gaging station is approximately 0.2 miles upstream from O'Hara Creek. The site is on land administered by the Forest Service at an elevation of about 1,540 ft. The drainage area upstream of this location is 1,913.1 mi^2 and the geology of the watershed is predominantly intrusive igneous and metamorphic.

Sediment transport measurements were made by USGS personnel predominantly during the spring snowmelt flows in 1994 and 1995. Additional measurements were made during a winter flood in December 1995 and near the snowmelt peak flows of 1997. All measurements were made from a cableway with the exception of the December 1995 measurements which were made from a bridge about 1000 ft downstream of the cableway. Additional information collected at the site include a survey of the stream reach, pebble counts of the surface material, core samples of the subsurface material material and samples of floodplain deposits. Figures 1 and 2 show photographs of the site looking upstream and downstream from the USGS gaging station. The cableway is approximately 210 ft downstream of the gage.

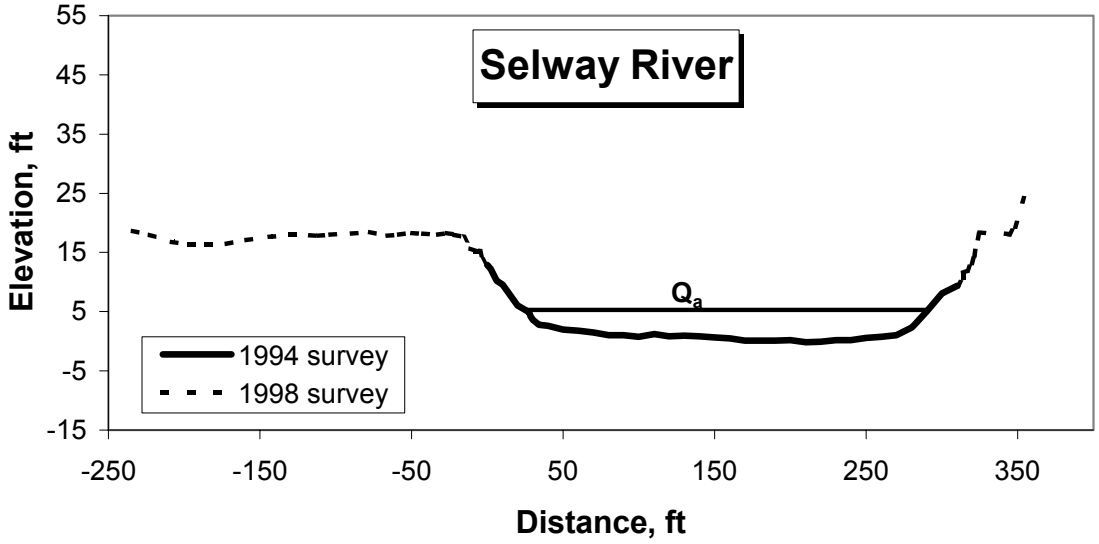
Figure 1. Selway River looking upstream from the USGS gaging station.

Figure 2. Selway River looking downstream from the USGS gaging station.

Stream discharge records are available for October 1929 to present. Average annual discharge (Q_a) for the period of record is 3,730 ft^3/s and bankfull discharge (Q_b) is estimate at 23,000 ft^3/s. The range of daily mean discharge for the period of record is 150 ft^3/s to 45,300 ft^3/s. The highest instantaneous discharge recorded was 48,900 ft^3/s on May 29, 1948.

Cross-Section

Figure 3 show a representative cross-section about 10.5 ft upstream of the USGS



gage house. The average gradient for the study reach is 0.0021 ft/ft.

Figure 3. Cross-section of the Selway River near Lowell, ID.

Channel Geometry

The station geometry relationships for the cross-section at the cableway are shown in Figure 4. Information for 1994 through 1997 for the sediment transport measurements taken from the cableway were used to develop the power relationships with discharge. Over the range of discharges when sediment transport was measured (4,760 to 37,700 ft^3/s) estimated stream width, estimated average depth and estimated average velocity varied from 279.2 to 297.0 ft, 3.8 to 9.5 ft, and 4.5 to 10.0 ft/s, respectively. The average reach slope is 0.0021 ft/ft.

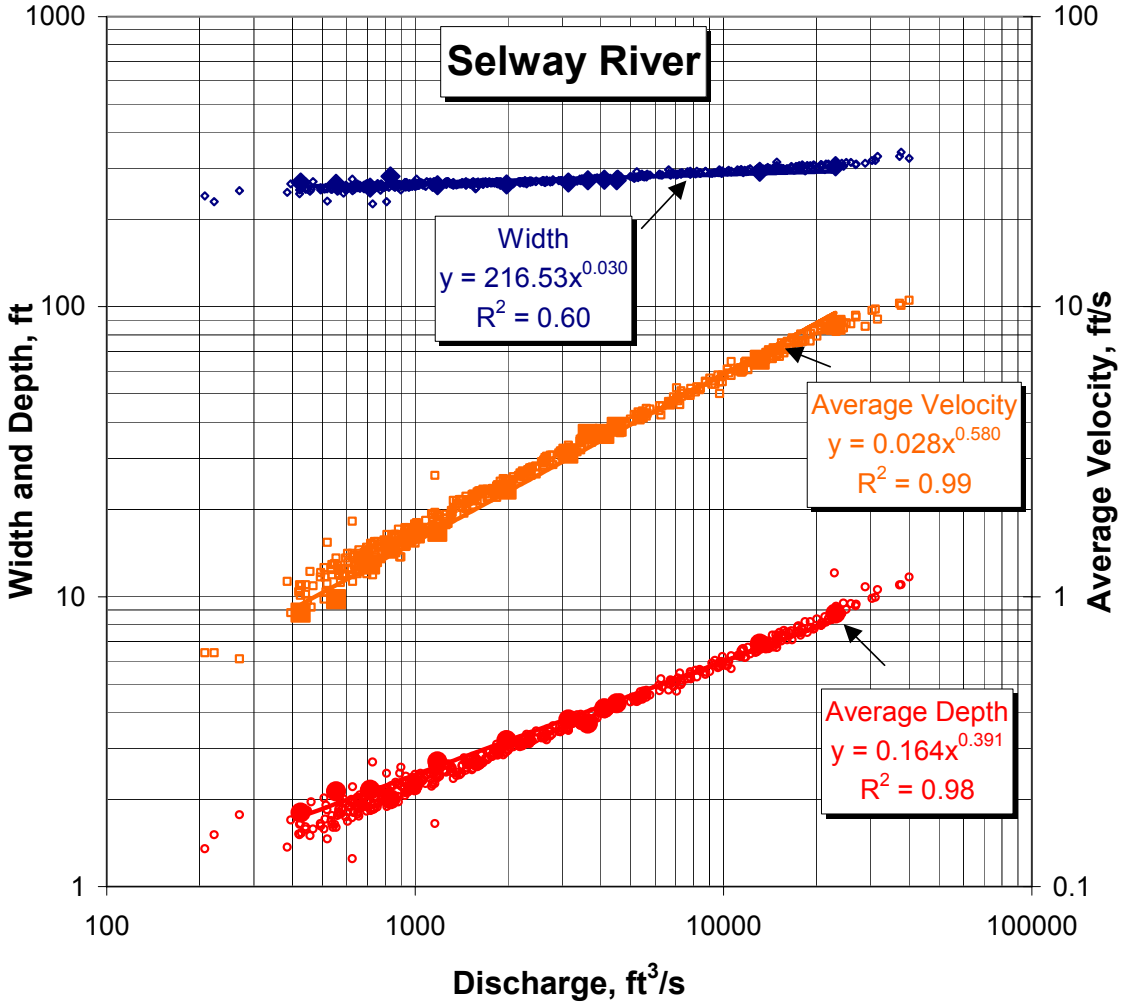


Figure 4. Width, average depth, maximum depth and velocity versus stream discharge at the cableway cross-section on the Selway River. (Solid symbols represent data used to develop the power relationships; open symbols were not used because they are either outside the range of discharges when sediment transport was measured or represent data collected prior to 1994.)

Channel Material

A surface pebble count was made in September 1994 near the USGS gage. Surface pebble counts were also made at three cross-sections and three cores of subsurface material were collected, one at each cross-section in September of 1995. The average D_{50} and D_{90} for the surface material were 200 mm and 315 mm, respectively in 1994 and 173 mm and 310 mm, respectively, in 1995 (Figure 5). The average D_{50} and D_{90} for the 1995 subsurface material are 24 mm and 131 mm, respectively. About 11% of the surface material is sand (2 mm) size or smaller. Three floodplain locations were sampled in November of 1997. The D_{50} of all of the floodplain samples was smaller than 0.27 mm.

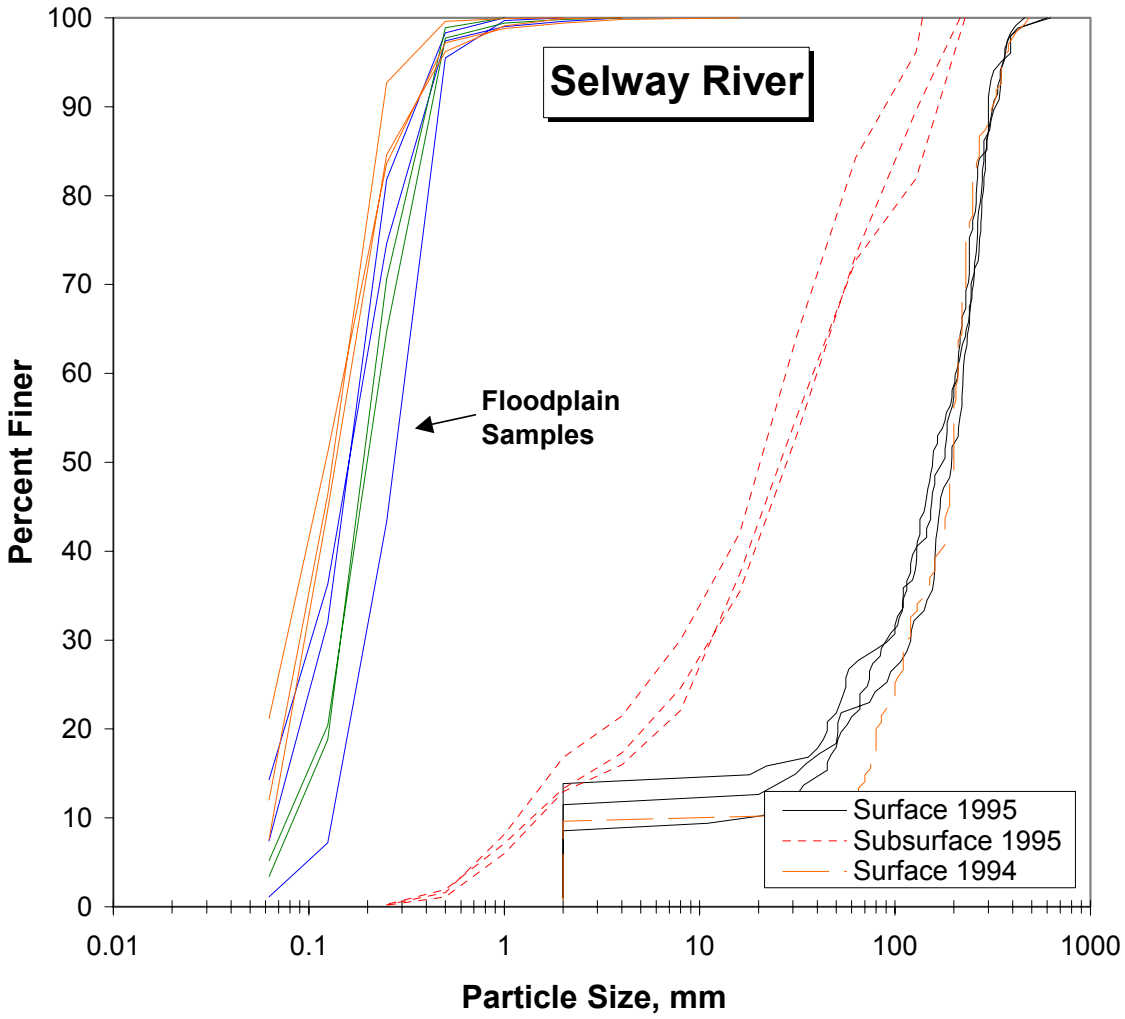


Figure 5. Particle size distribution for surface and subsurface material samples collected in the Selway River.

Sediment Transport

The bedload and suspended load measurement made in water years 1994 through 1997 were all made from the cableway, with the exceptions of the December 1995 measurements which were made from a bridge about 1000 downstream of the gage. The sediment transport data includes 72 measurements of bedload transport and 36 measurements of suspended sediment. Sediment transport measurements spanned a range of stream discharges from 4,760 ft^3/s ($1.27Q_a$; $0.21Q_b$) to 37,700 ft^3/s ($10.05Q_a$; $1.64Q_b$). Bedload transport ranged from 0.1 to 368 t/d and suspended transport ranged from 16.6 to 64,300 t/d. Over the range of measured discharges, suspended transport accounts for the majority of the material in transport with approximately an order of magnitude greater suspended transport than bedload transport (Figure 6).

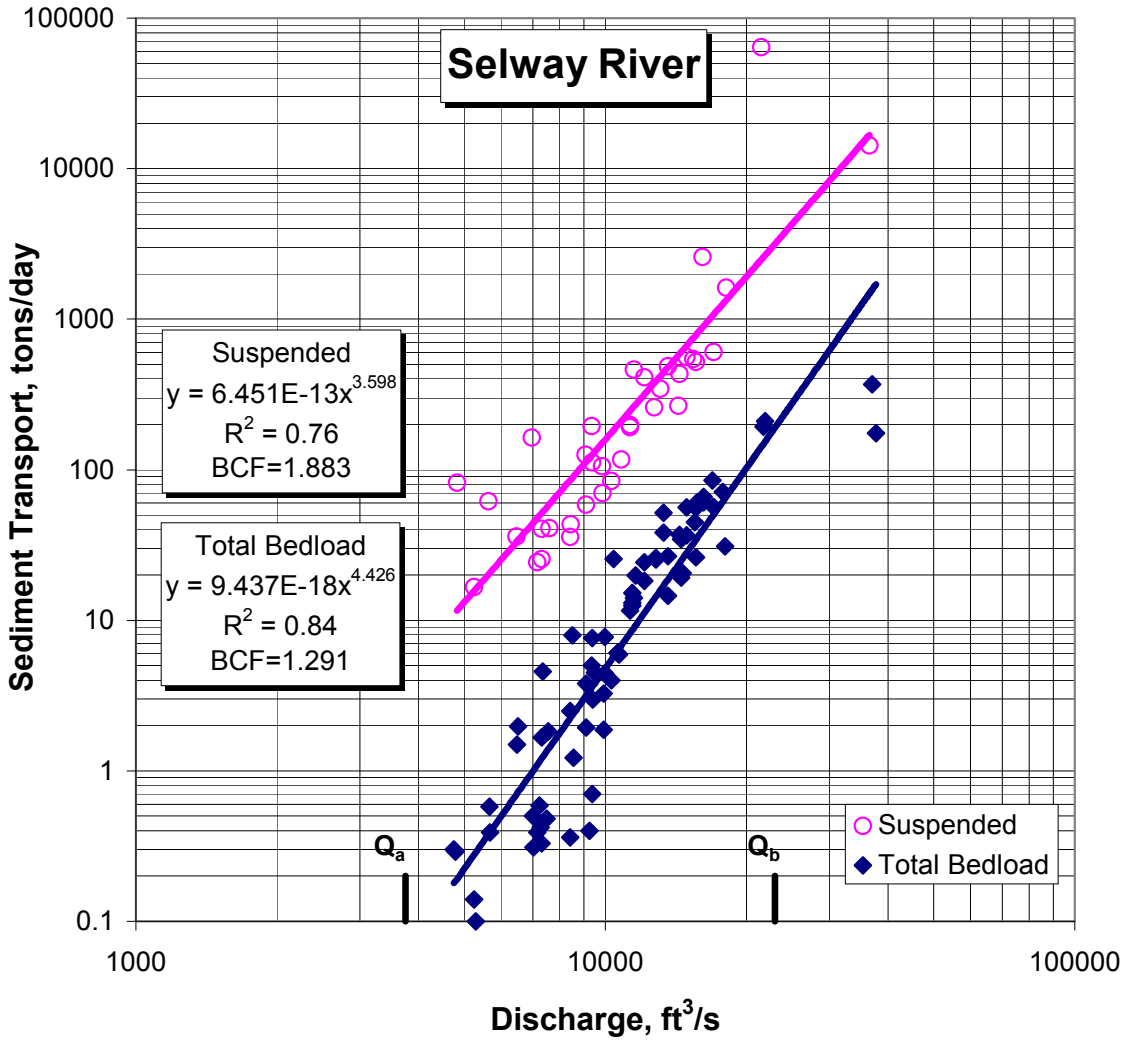


Figure 6. Bedload and suspended load transport rate versus discharge.

The bedload transport rates by size class (Figure 7) shows that the larger rates are associated with material 0.5 to 2 mm diameter. No power relationship is displayed for material greater than 32 mm since only two bedload samples contained this size of material. Bedload samples with material larger than 32 mm diameter were collected at discharges of 37,000 and 37,700 ft^3/s.

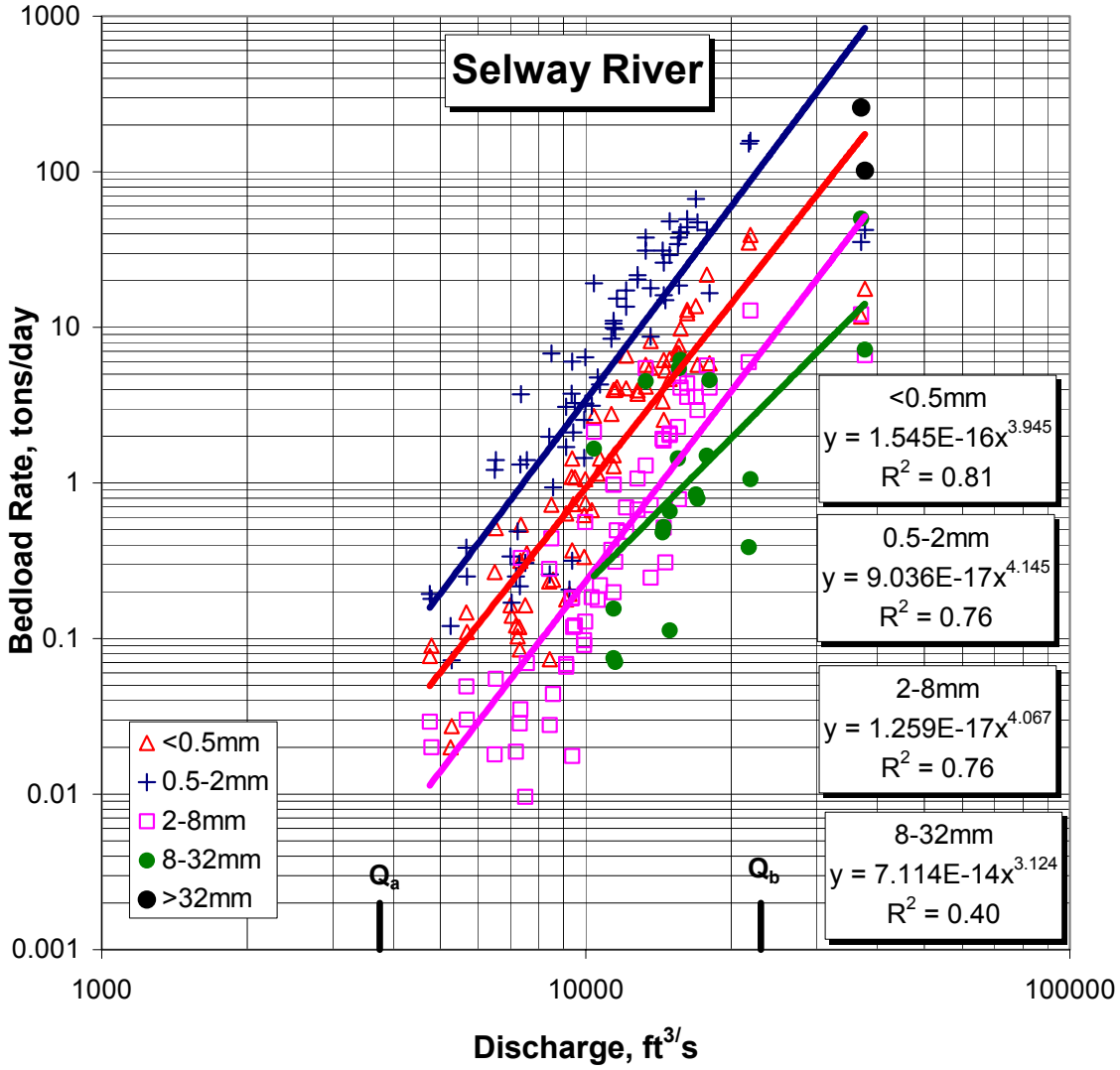


Figure 7. Bedload transport rate versus discharge for selected size classes.

The largest particle in the bedload sample generally increased with discharge (Figure 8). The largest particle measured in the bedload sample was 82 mm at a discharge of 37,000 ft^3/s. Although the largest particle size increased with discharge, the D_{50} for most samples was in the sand size, ranging from 0.48 to 1.12 mm. On two occasions, associated with higher discharges, the D_{50} was appreciable larger, 37.6 mm at a discharge of 37,700 ft^3/s and 51.3 mm at a discharge of 37,000 ft^3/s. The relationship between discharge and the largest particle in the bedload sample and supporting observations of large particles recently moved and associated instantaneous peak discharges for that snowmelt period suggest that discharges larger than bankfull discharge are required to initiate transport of material about the median size of the surface material.

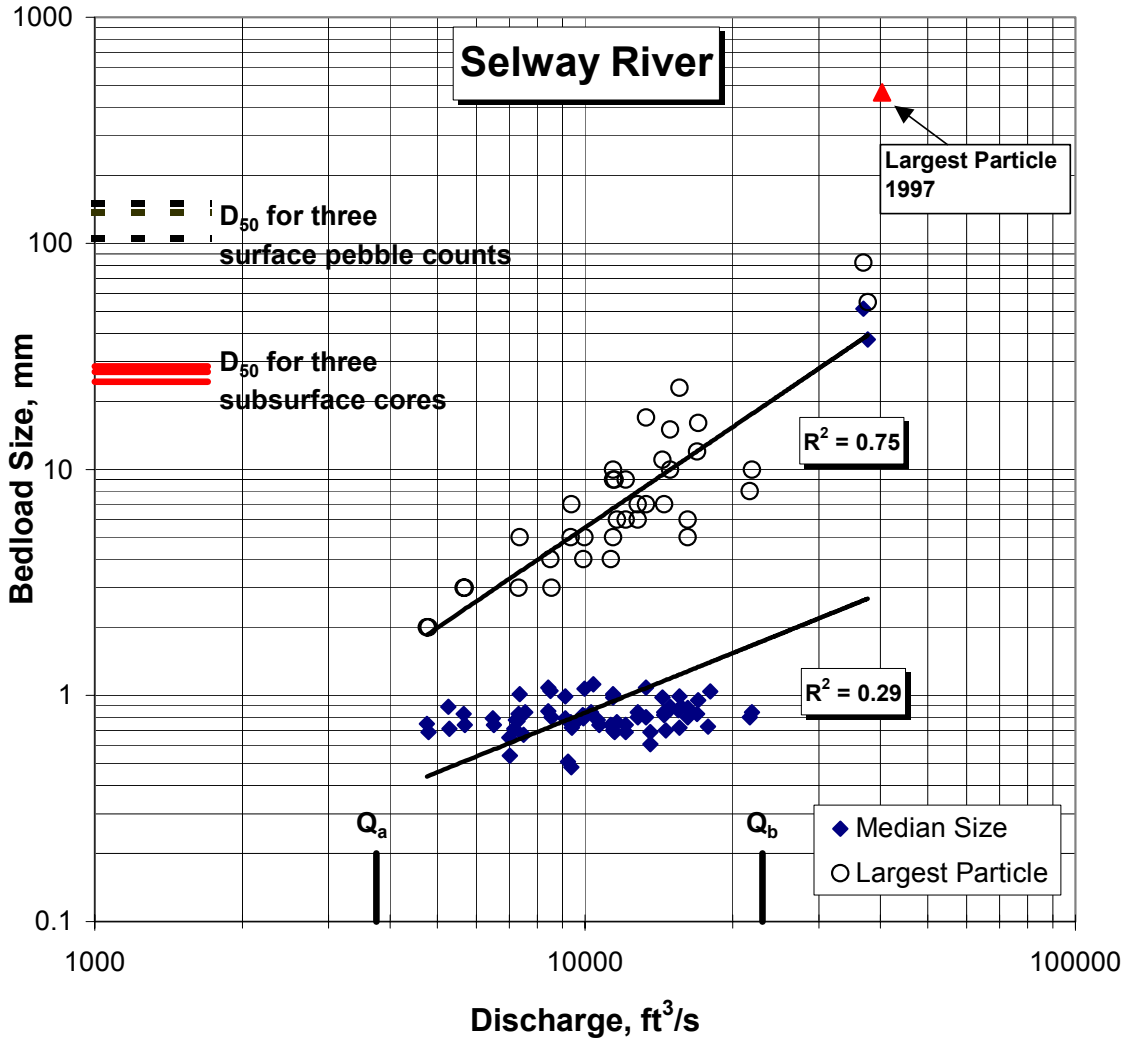


Figure 8. Largest particle in the bedload sample and median size of the sample versus stream discharge for the Selway River.